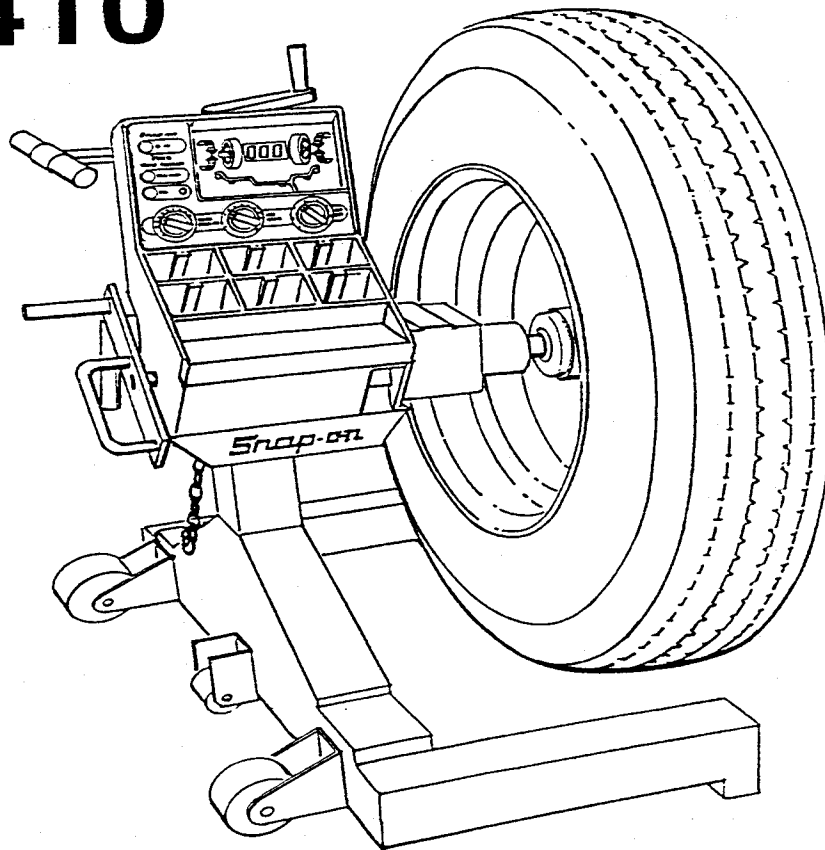


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# User's Manual

## WB410



### **Truck Wheel Balancer**

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***Snap-on***®



## Safety Cautions and Warnings

Before operating the balancer for the first time, review the following safety precautions.

1. Wheel balancers can cause flying particles. **Wear safety goggles while using wheel balancers.** Flying particles can cause eye injury.
  2. Never remove a cover or access panel on the balancer without first ensuring that the balancer is disconnected from the electrical power source.
  3. The standard power converter supplied with the WB410 balancer operates from a 115 vac, 50/60 Hz power source and converts the line voltage to 8.5 vac. The balancer may also operate directly from 12 vdc. Other converters are available.
  4. The balancer automatically returns to the *Normal* balancing mode if power is interrupted.
  5. Make sure the balancer is sitting on all three feet on a clean, level floor with no debris under the base.
  6. Remove all stones, old weights, heavy dirt, and other debris from the wheel before balancing.
  7. Do not attempt to balance a cracked, badly bent, or otherwise severely damaged wheel.
  8. Make sure that the wheel is centered and tightened securely on the balancer shaft before spinning.
  9. Make sure that all wheel weights are properly applied and secured.
- 

The information and specifications in this manual are based on the latest information available at the time of publication. The balancer manufacturer and the vehicle manufacturers reserve the right to make equipment changes at any time without notice.

First Edition: March 1994

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# WB410 User's Manual

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For service or parts assistance, call: 1-(800) 332-2526

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## Installation and Setup

1. Unpack the balancer and all accessories.
2. Check the contents list below and confirm that all standard accessories are present.

Qty	Item
1	Balancer Assembly
1	Stub Shaft and Bolt
1	Plug-in Power Converter
1	Light Truck Cone
1	Medium Truck Cone
1	Large Truck Cone
1	Rim Width Calipers
1	Spacer Ring
1	Hub Nut Assembly
1	User's Manual
1	Spindle Nut
1	Extension Handle, Lift Crank

3. Place the balancer on a firm solid floor.
4. The battery is disconnected at the factory prior to shipment. To reconnect, remove the two screws securing the battery cover. Connect the black lead to the battery (-) negative terminal and the red lead to the battery (+) positive terminal.
5. Connect the power converter cord to the cord on the back of the balancer measuring head.
6. Install the stub shaft and bolt into the spindle on the measuring head and, using a 9/16" torque wrench tighten to 250 - 300-inch/pounds.
7. Install the extension handle on the lift crank. Use a 5/32" or 4-mm Allen wrench to thread the extension into the crank. Tighten until snug.

## Power Sources

The power converter supplied with the WB410 furnishes 8.5-volts AC power to operate the balancer and charge the battery. There is no switch in the AC power circuit.

### Internal Battery

The battery supplied with the WB410 is an 8-volt, 8.5-ampere-hour lead-acid, maintenance free, gell-cell battery. Use the power converter supplied with your balancer to keep the battery charged during periods of non-operation.

There is no need to unplug the converter, since the battery cannot be overcharged. A fully discharged battery takes a minimum of 12 hours to recharge. If the battery becomes fully discharged, the balancer will still operate from the power converter, or an external 12-volt battery.

After 5-minutes of non-operation, the balancer automatically goes into a standby mode. This reduces power consumption to less than 1-watt, except for power required to charge the battery. If the balancer goes into the standby mode while on battery power, the battery continues to discharge, but at a greatly reduced rate. The balancer automatically powers up from the standby mode when you mount a wheel.

Battery life is approximately 5-years. You can extend battery life by keeping the battery fully charged, and by avoiding excessive vibration and temperature variations.

If you replace the battery, make sure you observe proper polarity when connecting the new battery. If polarity is reversed, the 3-ampere fuse (type 3AG/AGC, or equivalent) on the positive (+) battery lead will blow. *Do not use a slow-blow type fuse.*

### External 12-volt Battery

The WB410 can be powered by any 12-volt battery. Connect an external 12-volt battery to the same connector as the power converter. In this case, polarity need not be observed.

# INTRODUCTION

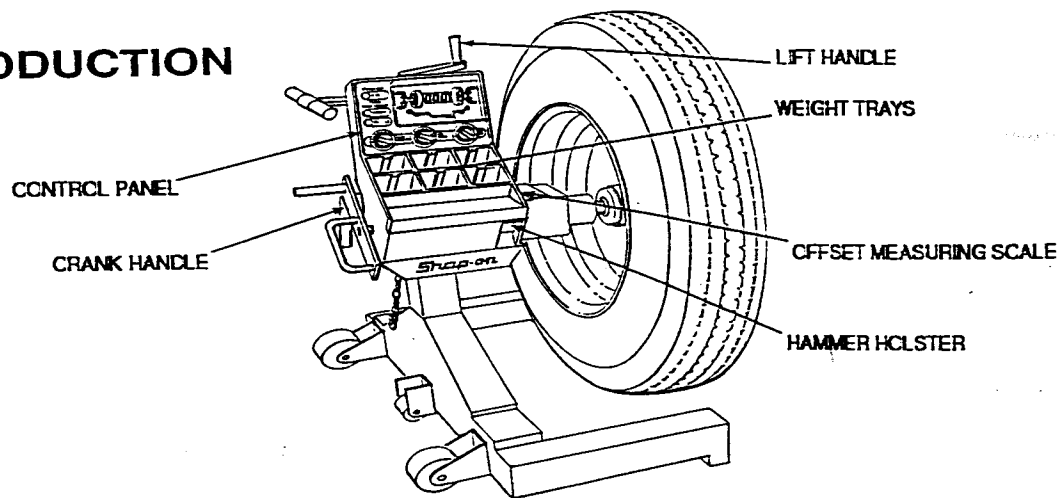


Figure 1. The WB410 is a hand-spun precision wheel balancer.

The Snap-on WB410 computerized truck wheel balancer combines state-of-the-art electronic accuracy with ease of use and simplicity of design. Your Snap-on balancer will give you years of reliable operation and wheel balancing profits. Take a few minutes to study this manual before operating your Snap-on balancer for the first time.

## FEATURES

The Snap-on WB410 represents today's most advanced concepts in wheel balancing with these high-precision features:

- **Safe, accurate, low-speed operation** — Balance truck wheels to 0.25-ounce (5-gram) accuracy at an operating speed of only 70 rpm. Automobile wheels can be balanced to 0.10-ounce (2-gram) accuracy.
- **Fast and simple** — With a single spin cycle of only 15 seconds (avg.) and a large display that shows the exact weight requirement and location, this Snap-on balancer promotes productivity and profits.
- **Electronic simplicity** — All major components can be replaced in the field, and the automatic self-calibration program allows the balancer to calibrate itself with little or no downtime. Automatically senses for truck or automobile wheel balancing mode. It even powers down when not in use, and automatically powers up when you mount a wheel.
- **Completely portable** — Roll the WB410 to the truck and operate off the internal rechargeable battery, or connect it to any 12-volt battery. The patented built-in lift mechanism raises a 500-pound wheel effortlessly.

- **Six balancing modes and automatic weight placement recalculation** — The balancer has six balancing modes:

- *Normal* for standard truck and auto clip-on weights on the inner and outer rim flanges
- *Static* for truck and auto specialty wheels.
- Four *Custom* modes for combinations of clip-on and stick-on weights, including hidden-weight balancing.

Balance the wheel in the *Normal* mode and let the balancer recalculate the weight requirements for any of the four *Custom* weight locations.

## DESCRIPTION

The WB410 is a hand-spun balancer. All operating instructions, measurement entries, and results are displayed on an easy-to-read control panel with bright, light-emitting diode (LED) indicators. This, plus the other following features, allows any operator to balance wheels and tires in the shortest possible time with the highest accuracy.

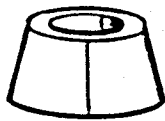
- **Control Panel** — The panel and its LED indicators display the wheel and tire dimensions and operating mode selected by the operator, as well as the results of all operations.
- **Crank Handle** — Permanently fixed handle to quickly and easily spin wheel to 70 rpm.
- **Weight Trays and Hammer Holster** — Trays for holding assorted weights and a weight hammer holster are at operator working level.
- **Offset (Wheel Distance) Measuring Scale** — For easy use and accuracy, the wheel offset scale is located at the right front of the balancer console.

# ACCESSORIES

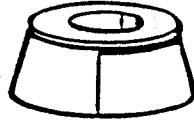
Your Snap-on balancer is equipped with the standard accessories listed below. Several optional accessories also are shown.

*For special applications, contact your local Snap-on Dealer, or call 1-800-332-2526.*

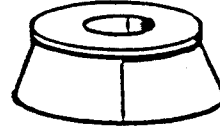
## Standard



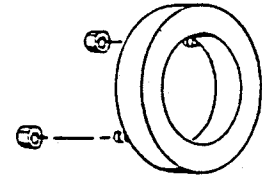
Light Cone  
(WB1133-01)



Medium Cone  
(WB1447-01)



Large Cone  
(WB1447-02)



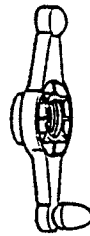
Spacer Ring  
(WB1489)



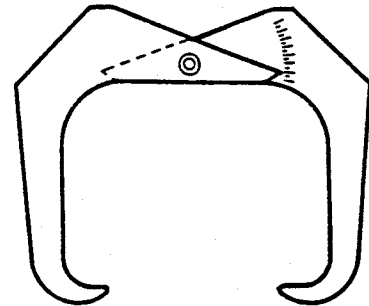
Stub Shaft  
(WB1179-04)



Spindle Nut  
(WB1470)



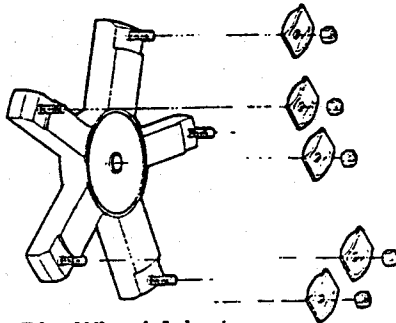
Hub Nut  
(WB1329)



Caliper  
(WB1158-02)

## Optional

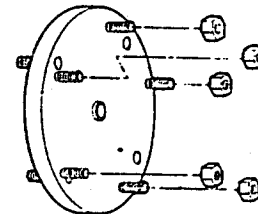
### Truck



#### Demountable Rim Wheel Adapters

WB1496-01 — 22" tube and 24-1/2" tubeless rims

WB1496-02 — 20" tube and 22-1/2" tubeless rims



#### Bolt Plate Adapters

WB1465-01 — For 10-bolt 11-1/4" (285 mm) and 8-bolt 275 mm bolt circle. 2-sided plate.

WB1465-02 — For 10-bolt 13-3/16" (335 mm) bolt circle. Single-sided.

WB1465-03 — For 10-bolt and 6-bolt 8-3/4" (222 mm) bolt circle. 2-sided plate.

WB1465-04 — For 8-bolt 11-1/4" (285 mm) bolt circle. Single-sided plate.

### Auto



SMALL CONE



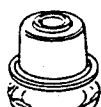
MEDIUM CONE



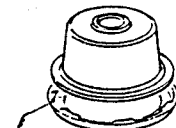
LARGE CONE



CONE SPRING

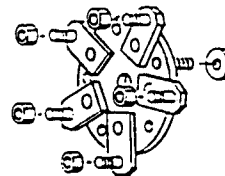


SMALL DRUM w/GASKET

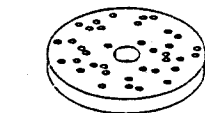
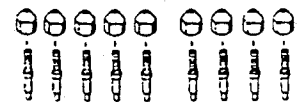


LARGE DRUM w/GASKET

Auto Accessory Kit (WB1497)



Universal Lug Adapter  
(WBA2)



Metric Bolt Plate Adapter  
(WB1499)

# BALANCER CONTROLS AND INDICATORS

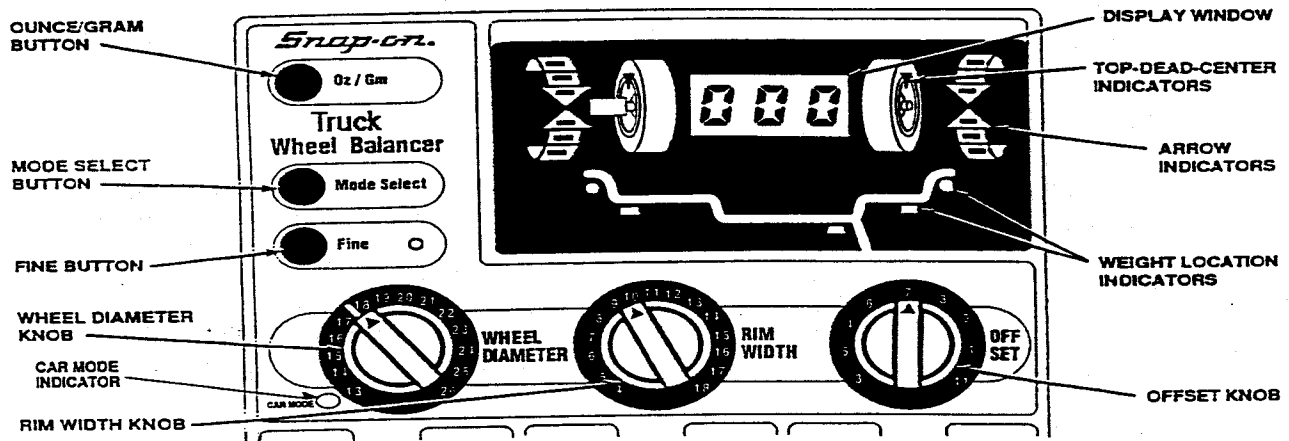


Figure 2. Balancer controls and indicators.

- Ounce/Gram Button —**  
 The Ounce/Gram button alternately changes displayed readings from ounces to grams.
  - Mode Select Button and weight location LED indicators—**  
 The Mode Select button works in conjunction with the LED indicators on the display. It selects the balancing mode and weight location. Weight requirements are automatically recalculated when the mode is changed.  
  
 For easy and accurate *Custom* mode operation, do the balancing operation in the *Normal* mode. Then press the Mode Select button for the desired custom weight location. The balancer will automatically recalculate the amount of weight required for the selected weight location. Press the button repeatedly until the correct combination of LED's lights for the desired weight location.
- | Mode Select Button | Mode     | Lights On |
|--------------------|----------|-----------|
|                    | Normal   | 1+5       |
| x1                 | Custom 1 | 1+4       |
| x2                 | Custom 2 | 2+4       |
| x3                 | Custom 3 | 1+3       |
| x4                 | Custom 4 | 2+3       |
| x5                 | Static   | 3         |
- Fine Button —**  
 Fine can be used with any mode selection. The Fine mode indicator lights when used.
  - WHEEL DIAMETER Knob —**  
 Turn the WHEEL DIAMETER knob to set rim diameter. Read the selection in the display window. Numbers 18 and above on the dial are for truck wheel applications, numbers 17 and below are for automobile rims.
  - RIM WIDTH Knob —**  
 Turn the RIM WIDTH knob to set rim width. Read the selection in the display window.
  - OFFSET Knob —**  
 Turn the OFFSET knob to set rim offset, or distance. Read the selection in the display window.
  - Display Window —**  
 The LED's in the display window indicate the diameter, width, and offset selections as each is entered into the balancer. After the balance spin, the display window indicates the weight (in grams or ounces as selected) to be placed at top dead center when the appropriate top-dead-center indicator is lit.
  - Arrow Indicators —**  
 The arrows light sequentially as the correct position for weight placement is approached.
  - Top-Dead-Center Indicators —**  
 The Top-Dead-Center indicator for the inner or outer rim flange lights when all six arrow lamps are on for the inner or outer weight placement.  
  
 To enter calibration, press and hold the Fine and Mode buttons for 2 to 3 seconds. Refer to the Automatic Calibration section for more details.

# BALANCING OPERATION

Operation of your Snap-on balancer is based on LED indicators on the control panel, three soft-touch buttons, and three control knobs that allow you to enter all information needed for precision balancing. The display indicates dimensions as they are entered. If the balancer is not used for 5-minutes, it automatically goes into standby mode. Mount a wheel, and the balancer automatically powers up.

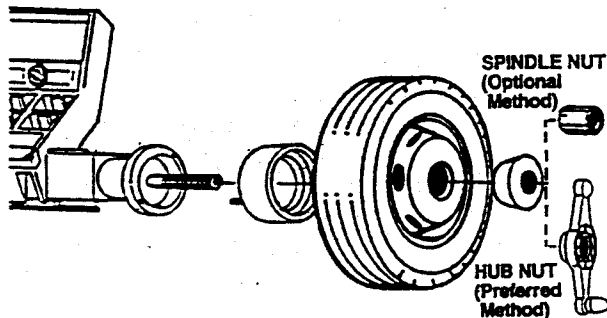
## Operating Summary

The following summary covers the nine main steps for fast, accurate wheel balancing with your Snap-on balancer. Later sections of this manual contain detailed information on all balancing modes and wheel mounting methods for your Snap-on balancer.

### WARNING

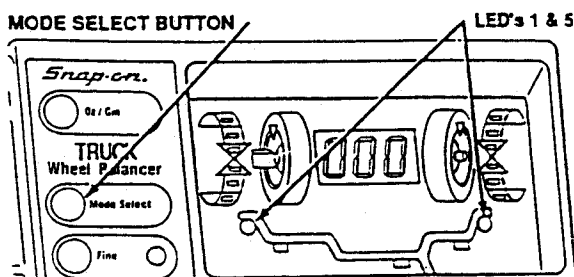
- Wheel balancers can cause flying particles. **Wear safety goggles while using wheel balancers.** Flying particles can cause eye injury.

1. Make sure the power switch is ON.
2. Mount the wheel.

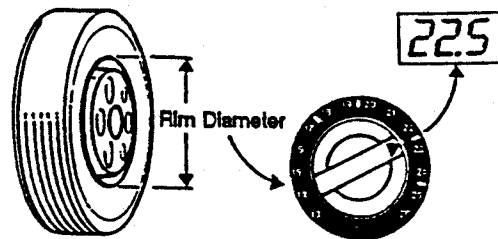


Most original equipment and aftermarket wheels can be mounted with some combination of the standard Snap-on mounting adapters. Refer to the *Wheel Mounting Methods* section of this manual for more instructions.

3. Depress the Mode Select button until LED's 1 and 5 light to indicate the *Normal* balancing mode.

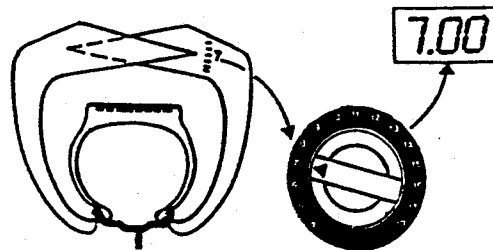


4. Set the **WHEEL DIAMETER** knob to the diameter shown on the sidewall.

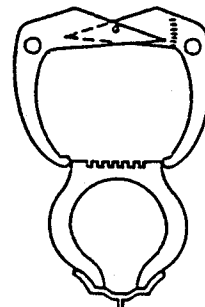


The display will show the selected diameter.

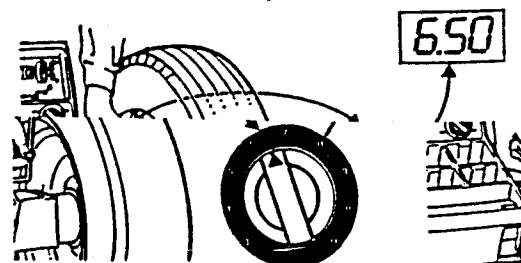
5. Measure the wheel width with a caliper.



Adjust the **RIM WIDTH** knob to the correct setting, as shown on the display. If the tire is too wide to accept the calipers, you can measure over the tread width, as shown below.



6. Set the rim offset, as follows:



The display will show the selected offset.



- a. Pull the rim offset gauge arm out and position the tip against the rim flange surface (regardless of where the inner weight will be placed).
- b. Read the rim distance value off the gauge arm at the point where it enters into the housing.
- c. Set the RIM DISTANCE knob to the rim distance value.

## 7. Spin the wheel.

Raise the wheel using the lift crank handle at the top of the balancer. The wheel should clear the floor by approximately 1/2-inch (13 mm).

Spin the wheel by hand using the crank handle. Turn the crank handle clockwise until buzzing is heard and the display goes blank. Immediately release the handle and allow the wheel to spin freely until the measuring cycle is complete and the buzzer sounds.

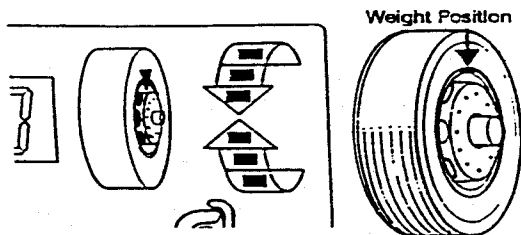
Using the lift crank handle, lower the wheel until it touches the floor and stops spinning. Do not use your hand to stop a spinning wheel. You can stop spinning car and light truck wheels by using the weight hammer against the tire sidewall.

Normal balance speed is approximately 70 to 84 rpm. If spun too fast, the buzzer will sound continuously until the wheel slows to proper measurement speed. The balancer will function normally even when a wheel is spun too fast. However, balancer cycle time will increase.

If the wheel is spun in the wrong direction (counterclockwise), EEE will appear on the display. Turning the wheel clockwise will remove EEE from the display and allow the balancer to function properly.

Do not interfere with the machine during the measuring cycle or wrong readings can occur.

## 8. Attach the weight:



- a. Starting with either side of the wheel, rotate the wheel in the direction of the lit arrow until all arrows light indicating the correct position. The top-dead-center light and the correct weight will be displayed.
- b. If you want a normal mode balance, attach the weights now. If you want a custom balance, see the next section.
- c. Securely apply the indicated weight at the top-dead-center location.
- d. Repeat 8a and 8c for the other side of the wheel. Make sure that the stick-on weights will clear the vehicle disc brake caliper.

## 9. Do a check spin.

Repeat the spin cycle. Zero weight readings should appear for both sides of the rim.

**OPTIONAL: Fine balance** — Truck wheels can be balanced to 0.25-ounce (5-gram) accuracy, while car and light truck wheels can be fine balanced to 0.10-ounce (2-gram) accuracy. Press the Fine button at the left side of the control panel for fine balancing accuracy.

For truck wheels, you *must* re-spin the wheel after switching to fine. For car and light truck wheels, it is *not* necessary to spin the wheel again. If a repeatable balance cannot be achieved, foreign material may be inside the tire moving around, causing a different imbalance each time. In this case, the material must be removed before the tire can be accurately balanced.

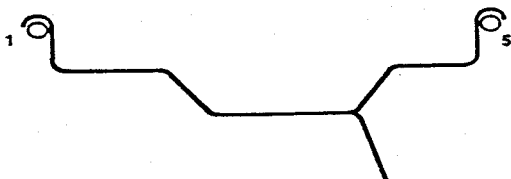
## Balancing Errors

When a balancing error occurs, the EEE message appears on the display. If you spin the wheel in the wrong direction — *counterclockwise* — during balancing, or if the measurement cycle is aborted by stopping the wheel too soon, the EEE message appears on the display. You can clear any error by spinning the wheel up to balancing speed.

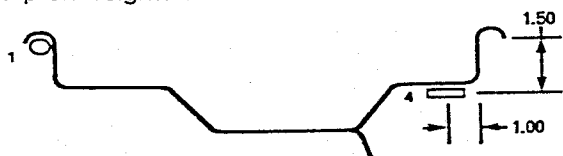
# AUTOMATIC WEIGHT RECALCULATION FOR CUSTOM WEIGHT LOCATION

The Snap-on balancer features one normal and four custom balancing modes for combinations of clip-on and stick-on weights, including hidden-weight balancing. A static balancing mode also is included.

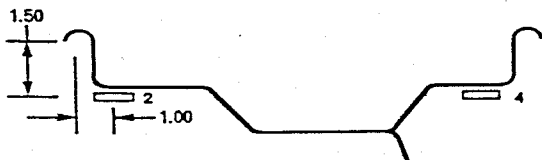
The LED's on the display panel indicate the desired weight locations, as shown below. When placing the weights for any of the Custom modes, observe the position location dimensions shown. The balancer is programmed for these positions only, other placement positions may require different weights.



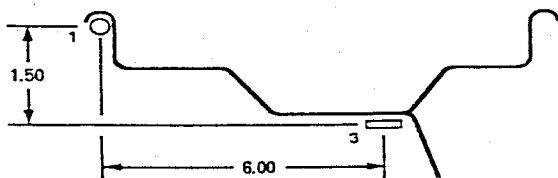
**Normal** — LED's 1 and 5 light to indicate standard clip-on weights on the inner and outer rim flanges.



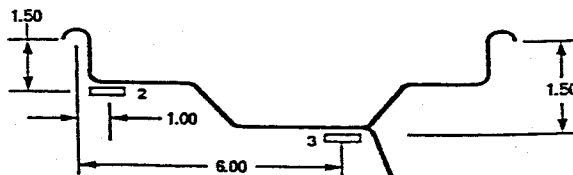
**Custom 1** — LED's 1 and 4 light to indicate a standard clip-on weight on the inner flange and a stick-on weight on the outer bead-seat area of the rim.



**Custom 2** — LED's 2 and 4 light to indicate stick-on weights on the inner and outer bead-seat areas of the rim.



**Custom 3** — For this hidden-weight method, LED's 1 and 3 light to indicate a standard clip-on weight on the inner flange and a stick-on weight toward the center well (drop center) inboard area of the rim.



**Custom 4** — For this hidden-weight method, LED's 2 and 3 light to indicate a stick-on weight on the inner bead-seat area and a stick-on weight toward the center well (drop center) inboard area of the rim.

When using the Custom 3 or Custom 4 mode, the inner and outer weights must be placed 6 inches (4 inches for auto) apart longitudinally for accurate balancing. The balancer is programmed for a standard weight spacing of 6 inches (4 inches for auto) for these modes.

For simple and accurate balancing, the *Normal* mode can be used for all balancing measurements. After the balancing spin cycle, press the Mode Select button until the LED indicators light for the desired *Custom* mode weight locations. The balancer will automatically recalculate the amount of weight required for each custom location.

## Static Balancing

For static balancing, the rim width and offset dimensions do not need to be entered into the balancer. Simply enter the wheel diameter and press the Mode Select button to select the static balancing mode. After the spin cycle, the inner weight LED's and TDC indicator will light to show the required weight amount and location. The weight can be placed on the inner or outer rim flange or toward the center of the rim. The amount of weight also can be divided equally between the inner and outer rim flanges.

If you enter the rim width, offset, and diameter and spin the wheel in the *Normal* balancing mode, you can select the static mode after the spin cycle; and the balancer will recalculate the amount and location of the weight for static balancing.

---

# AUTOMATIC CALIBRATION

The Snap-on WB410 balancer is calibrated by computer before shipment and should not require recalibration in normal service. If the electronics assembly or the back panel assembly is replaced, however, the balancer should be recalibrated. Additionally, if balancing results appear to be irregular, the balancer may require recalibration. The WB410 contains a program for automatic self-calibration, which can be performed in about the same time that it takes to balance a single wheel.

## Calibration Procedure

Follow this procedure to calibrate your balancer:

### 1. Fine balance a wheel

Fine balance a wheel as explained in the *Balancing Operation* section. Use a wheel of the kind and size normally balanced on the balancer. The wheel must be balanced in the NORMAL mode. If the balancer is in the STATIC mode or any of the Custom modes, the calibration program will not operate.

To fine balance a wheel after standard balancing, press the Fine button on the control panel and re-spin the wheel. Then attach additional weight as indicated on the display.

### 2. Attach a calibration weight.

Rotate the wheel until both outer position arrows and the top-dead-center indicator light. For truck wheels (diameters above 17"), attach a 12-ounce (or 400-gram, depending on the selected measurement units) weight to the outer wheel rim at TDC; for light truck and auto wheels (diameters 17" or below), attach a 3-ounce (100-gram) weight.

### 3. Enter the calibration program.

With 000 displayed, press and *hold* the Fine button. While *holding* the Fine button, press the Mode Select button for 3 to 4 seconds. When the balancer enters the calibration program, the display will show a flashing CCC.

### 4. Spin the wheel at least four times.

Spin the wheel using the normal balancing cycle.

Turn the crank *clockwise* until the buzzer sounds. Release the handle and let the wheel spin freely until the cycle is complete (approximately 15 seconds).

If you spin the wheel too fast, the buzzer will sound continuously until the wheel slows to measuring speed. The calibration program operates normally and accurately, but calibration time will be increased.

After the wheel stops and the flashing CCC message reappears, spin the wheel again. Calibration usually requires four consecutive, accurate spins.

After the final accurate spin, the calibration weight will appear on the display for the outer rim flange and three zeros will appear for the inner flange. Calibration is now complete.

### 5. Remove the calibration weight.

After successful calibration, the balancer stores the new calibration values in memory. Remove the calibration weight from the wheel and proceed with normal operation of your balancer.

If calibration is abandoned before completion, the original (previous) calibration values are retained.

## Calibration Error

If an error occurs during any of the spin cycles, the EEE error message appears on the display. The calibration program is aborted, and the balancer retains the previous calibration values.

The EEE error message may result from using an incorrect calibration weight. Accidentally bumping the balancer during calibration also could cause an error message. To correct a calibration error, remove the calibration weight and spin the wheel to remove the EEE's. Then, verify that the wheel is still balanced and repeat the calibration procedure.

If calibration fails, try the calibration program again from the beginning. Changing the wheel and the calibration weight may correct a calibration failure. If the balancer repeatedly fails the calibration program, contact your Snap-on dealer for assistance.

For calibration assistance, call: 1-(800) 332-2526

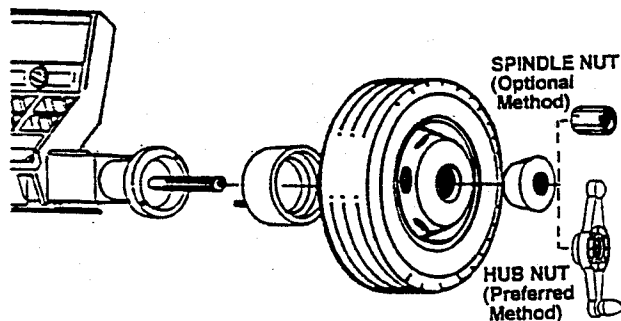
# WHEEL MOUNTING METHODS

Careful mounting is essential because the wheel is balanced according to how it is mounted on the balancer. If the wheel is not well centered, it cannot be balanced accurately.

Most stud-centered wheels have concentric center holes, which allow fast and easy cone mounting. Adapters should be used only in problem situations and on some aftermarket specialty wheels.

The accessories for your Snap-on balancer allow the following wheel mounting methods.

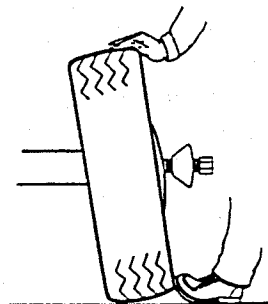
## Cone Mounting — Truck



Hub-piloted wheels must be cone mounted. Hub piloted wheels are identified by the lack of stud hole countersinks.

Install the spacer ring against the back flange of the balancer. The spacer ring is required for large and medium truck cones, and optional for the light truck cone.

Choose a cone that fits best when placed into the wheel center hole. With the tire on the ground, slide the balancer so that the spindle extends through the wheel center hole. Mount the cone on the protruding spindle and slide into the wheel center hole. Raise or lower the spindle with the lift handle, as needed for optimum alignment. Thread the hub nut onto the spindle, and hand tighten. (For extra wide wheels, you may have to use the spindle nut instead of the hub nut.)



Apply pressure with your foot against the wheel to keep the wheel upright while tightening. Raise the wheel slightly until it clears the ground, push the bottom of the tire toward the balancer, and then securely tighten the hub nut. (If you use the spindle nut, tighten to approximately 40 ft/lbs with a 1-1/2" socket.) **DO NOT USE AN IMPACT WRENCH.**

## Bolt Plate Adapters — Truck

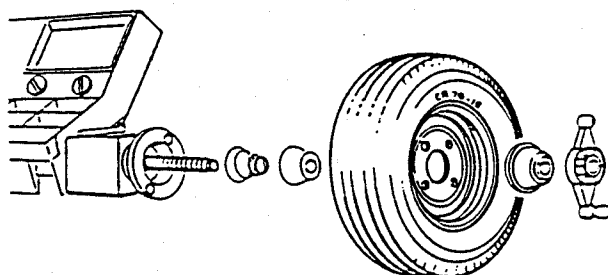
Stud-piloted wheels must be mounted using a bolt plate adapter. Stud-piloted wheels are identified by the presence of stud hole countersinks. Uni-mount wheels can also be mounted using a bolt plate adapter.

Install the spacer ring against the back flange of the balancer. Select the correct bolt plate for the bolt pattern and wheel size you are mounting. With the bolt plate facing away from the balancer, slide it onto the stub shaft. Make sure that the locating pins on the bolt plate engage their respective holes in the spacer ring. Secure the bolt plate in place by tightening the spindle nut to approximately 40 ft/lbs (50 Nm).

With the tire on the ground, slide the balancer so that the spindle extends through the wheel center hole, and the studs align in the stud holes. This may require slight height adjustments using the lift handle. Hand-tighten the wheel nuts until snug. Then, using a criss-cross pattern, tighten the nuts securely to approximately 40 ft/lbs (50 Nm).

## Back Cone Mounting — Auto

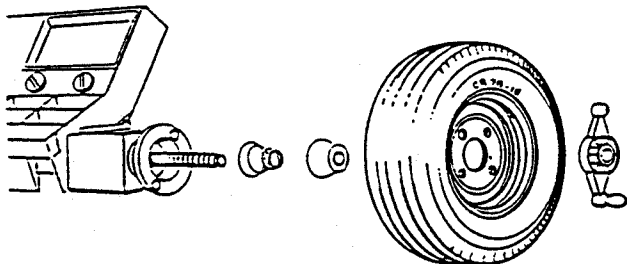
Back cone mounting is the most common way to mount automobile wheels. Choose the cone that fits best when placed through the wheel center hole from the rear. Slide the cone spring and cone on the shaft. Place the wheel on the cone and be sure that the *cone centers the wheel* when you tighten the handle.



Choose a pressure drum that contacts the wheel on a flat surface. Do not center the wheel with the pressure drum. Tighten the wheel firmly against the mounting flange. Hold the handle in place and rotate the wheel when tightening. Be sure that the wheel is *firmly against the mounting flange* and the handle threads engage at least three turns on the shaft.

## Back Cone Mounting Without Pressure Drum — Auto

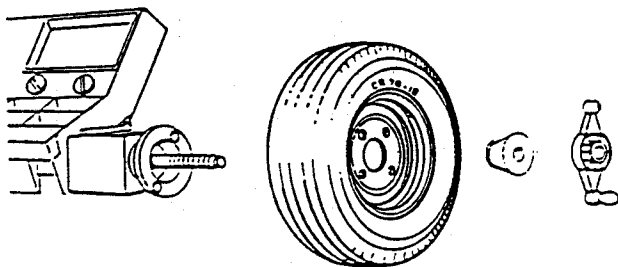
**CAUTION:** Be sure that the handle does not contact the cone, or the wheel will not be centered and mounted securely.



On some extended-center wheels with small hub diameters, the pressure drum cannot contact the front face of the wheel properly. Such wheels can be mounted using the standard back cone method without a pressure drum. Be sure that the handle contacts the wheel center evenly and that the wheel is centered on the cone.

## Front Cone Mounting — Auto

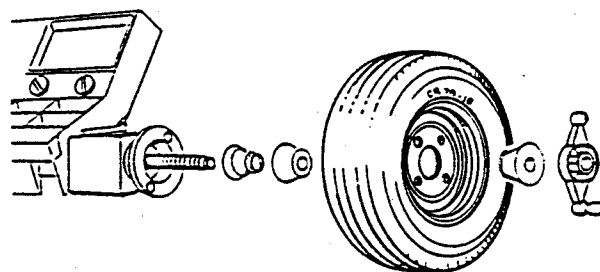
Front cone mounting is required when using the light truck cone and is also an acceptable alternative for many automobile wheels. The wheel center hole must be true on the outside of the wheel to use the front cone mounting method.



Choose the cone that fits best when placed through the wheel center hole from the front. Slide the wheel on the balancer shaft without a back cone or spring on the shaft. Place a cone on the shaft, through the front of the wheel. Be sure that the *cone centers the wheel* and that the wheel is squarely against the mounting flange when you tighten the handle.

## Double Cone Mounting — Auto

**CAUTION:** The cones must not touch each other. If the cones touch, the wheel will not be centered and mounted securely.



Double cone mounting can be used for some specialty wheels, such as those on a Porsche 928. The back cone centers on the formed part of the wheel, and the front cone centers on the hole.

## Mounting Errors

Regardless of the mounting method used, *the wheel must be centered* before balancing. A wheel should be mounted on the appropriate cone or adapter and tightened carefully to ensure proper centering and mating against the balancer flange.

The wheel must be clean and free of large burrs or nicks, especially where it mates with the cone or adapter and the balancer flange. Any dirt between the flange and the mating surface of the wheel will cause misalignment on the shaft. A misalignment of the thickness of a matchbook cover will cause an unbalance of 0.50 ounce (15 grams) or more on automobile wheels and 2 ounce (50 grams) on light truck wheels.

The wheel also must be tightened securely to prevent it from slipping in relation to the flange. If the wheel slips on the balancer, accurate weight measurement and location are impossible.

## Rotational Errors

When a wheel is mounted on the balancer — whether on a cone or an adapter — it is fixed in a particular position in relation to the balancer shaft. If the wheel is rotated 180° from the initial position and retightened, a different balance reading may result. Such differences are called *rotational errors*.

When checking balance with the wheel in one position and then rotating it 180° and respinning it, the difference between the two readings could be as much as 0.50 ounce (15 grams) for cone-mounted automobile wheels, 0.75 ounce (20 grams) for adapter-mounted automobile wheels, and 2 ounces (50 grams) for light truck wheels.

The actual balance error is one-half of the displayed amount because the reading is the sum of the error and the weight required to counterbalance the error.

To do a rotational test, first fine-balance the wheel. Then loosen the wheel on the shaft, rotate it 180°, and retighten the handle. Spin the wheel in the normal balance mode to check for rotational errors.

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## TIRE AND WHEEL MATCHING (Weight Compensation)

Wheel balancing can sometimes be improved by wheel and tire matching, or adjusting the tire position on the wheel to compensate for light and heavy spots in the wheel and tire. This may be beneficial if the wheel, or the tire-and-wheel assembly, has visibly noticeable radial runout when spun through a balancing cycle on the balancer. Tire and wheel matching also may aid the balancing operation by reducing the required weight if weight is excessive. If neither of these two conditions exists, tire and wheel matching probably will not significantly improve balancing.

The WB410 balancer can be used to aid tire and wheel matching in either of the two ways explained below. Weight measurements should be taken in the *STATIC* balance mode. This can be done either by entering just the wheel diameter and spinning the wheel in the static balance mode, or by entering all wheel dimensions and spinning the wheel in a normal balance cycle. Then press the Mode Select button for the static mode, and let the balancer recalculate the static weight measurement.

For either method, begin by removing all old weights and any dirt or debris from the wheel and tire.

### Method One

1. Mount the wheel by itself — without a tire — on the balancer.
2. Spin the wheel for a balance cycle.
3. Note the static weight location indicated by the balancer. This is the light spot of the wheel. Place a chalk mark on the rim at this location.
4. Mount the tire on the wheel and repeat the balance cycle.
5. Again note the static weight location indicated by the balancer. This is the light spot of the wheel and tire combination. Place a chalk mark on the tire at this location.
6. If the light spot of the wheel and the light spot of the wheel-and-tire combination are at the same, or close to the same location, loosen the tire on the rim and rotate it 180 degrees so that the two light spots are opposite each other.
7. Reinstall the wheel and tire on the balancer and proceed with normal dynamic balancing.

If the light spot of the wheel and the light spot of the wheel-and-tire combination are *not* at or close to the same location, balance will not be improved significantly by repositioning the tire on the wheel.

### Method Two

1. Mount the wheel and tire on the balancer and spin the wheel and tire for a balance cycle.
2. If the amount of static imbalance *exceeds 16 ounces (for truck wheels) or 4 ounces (for auto wheels)*, place chalk marks on the wheel and on the tire at the weight location indicated by the balancer.
3. Remove the wheel and tire from the balancer and loosen the tire on the rim. Rotate it 180 degrees so that the two light spots are opposite each other.
4. Reinstall the wheel and tire on the balancer and proceed with normal dynamic balancing.

If the static imbalance of the wheel-and-tire combination does *not exceed 16 ounces (for truck) or 4 ounces (for auto)*, balance will not be improved significantly by repositioning the tire on the wheel.

## SPECIFICATIONS

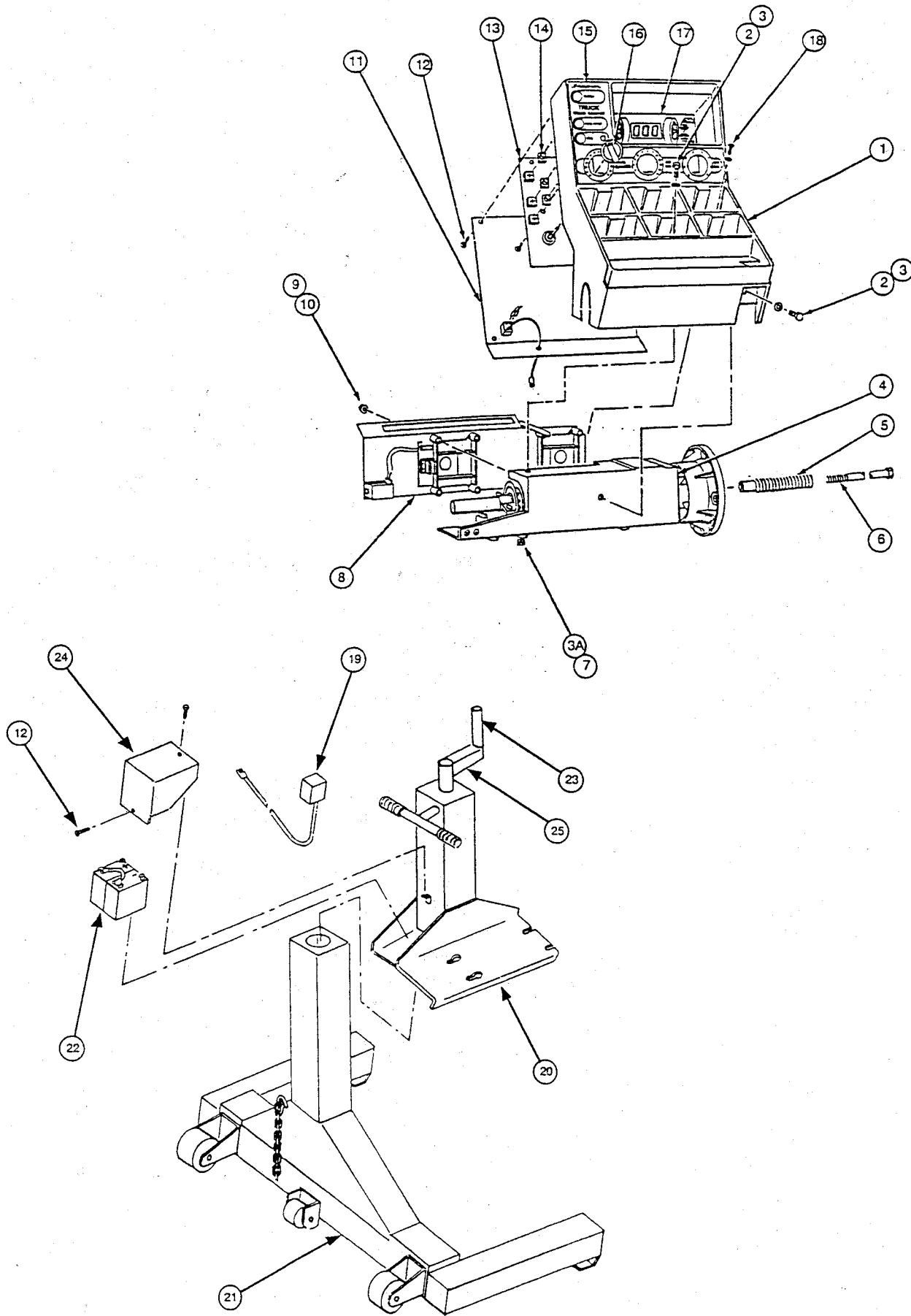
- Dynamic and static balance, twin-plane balancer.
- Single spin cycle: 15 seconds (avg.).
- Weight displayed in grams or ounces.
- Weight displayed in 2.0-ounce (50-gram) increments for standard truck wheel balancing, 0.25-ounce (5-gram) for auto.
- Fine balancing to 0.25-ounce (5 grams) for truck wheels, 0.10-ounce (2-gram) for auto.
- Automatic weight recalculation with changes in dimensions or mode selection.
- Automatic calibration program.
- Maximum tire and wheel weight — 500 pounds (227 kilograms)
- Operation from 110/120/220/240 volts, 50/60 Hz., or 12 vdc.)

## WB410 PARTS LIST

(See Assembly Drawing On Next Page)

Item	Part Number	Description	Qty.
1	WB7553-64	Control Housing	1
2	WB0205-0031	Washer, 5/16" x 7/8"	2
3	WB0102-3118-12	Hexhead Capscrew, 5/16-18 x 3/4"	2
3A	WB0103-3118-12	Sockethead Screw, 5/16-18 x 3/4"	4
4	WB7667-03	Main Housing Assembly	1
5	WB1179-04	Stub Shaft	1
6	WB0118-3824-81	Bolt, Stub Shaft	1
7	WB0205-0032	Washer, 5/16" x 1/2"	4
8	WB7673-52	Sensor Panel Assembly	1
9	WB0302-1032	Hexnut, ESNA 10-32	9
10	WB0201-0010	Flatwasher, No. 10	9
11	WB2677	Back Cover Assembly	1
12	WB0901-0818-08	Screw, Self-Tapping, 8-18 x 1/2"	9
13	WB7909-02	PC Board Assembly, Balancer Charger	1
14	WB8073	Switch Extender	3
15	WB7699-05	Front Panel	1
16	WB1591-02	Control Knob	3
17	WB8041-51	Display Window	1
18	WB0907-1214-10	Screw, 12-14 x 5/8"	2
19	6605-0001-01	Converter, Wall Plug	1
20	WB8312	Head Mounting Assembly	1
21	WB8314	Lower Base Assembly	1
22	WB1463	Battery, 8-volt	1
23	WB2574-01A	Extension Handle, Lift Crank	1
24	WB1493-02	Battery Cover	1
25	WB2574-01B	Crank, Lift	1
NS	WB1369	Logo, Snap-on	1
NS	WB1595-01	Weight Tray Label Set, Ounces	1
NS	WB1595-02	Weight Tray Label Set, Grams	1 (optional)

For service or parts assistance, call: 1-(800) 332-2526



The WB410 Truck Wheel Balancer assembly (exploded view).



# SERVICE AND REPAIRS

Your Snap-on balancer is completely field serviceable. The balancer also can be serviced at your Snap-on service center. If your balancer appears to malfunction (for example, cycle time is too long, modes do not light), reset the computer by turning the power switch OFF and ON. Replacement parts and service assistance are available from your Snap-on dealer. For factory assistance, call: 1-(800) 332-2526.

## Preventive Maintenance

1. Clean mounting adapters, mounting surface, and balancer spindle regularly. Accumulations of grease, oil, and dirt create an out-of-balance condition and cause premature wear.
2. Maintain a light coating of grease on all four sides of the upright portion of the lower base assembly.
2. Remove wheel weights and debris from under the balancer. Remove tires, tools, and any parts leaning against the balancer. Make sure the balancer rests only on the two foot pads and the load wheel.
3. Clean the control panel with window cleaner. Do not use solvents.

## Upper Housing Removal

The upper housing must be removed from the lower base, figure 3, before maintenance can be performed on any of the upper housing components. Proceed as follows:

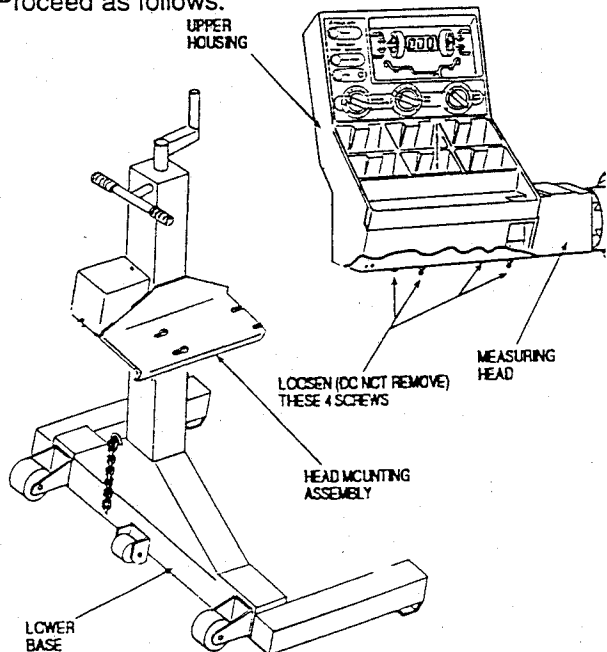


Figure 3. Removing the upper housing from the lower base.

1. Disconnect ac power from the balancer.

2. Use a 1/2-inch open-end wrench, or a 1/4-inch Allen wrench (as required), to *loosen* the four capscrews and washers below the measuring head. The capscrews fit into keyhole slots on the head mounting assembly. Loosen them a few turns; do not remove them.
3. Slide the upper housing assembly outboard (toward the spindle) to free the screws from the keyhole slots. Then lift the assembly off the balancer base.
4. Move the upper housing assembly to a workbench where further disassembly can be performed as necessary.

## Printed Circuit Board and Display Panel Removal

Remove and replace the PC board and display panel, figures 4 and 5, as follows:

1. Remove the upper housing assembly from the lower base, as previously described.
2. Remove the four Phillips screws from the control housing back cover and remove the cover.
3. Disconnect the two cable connectors from the back of the PC board.

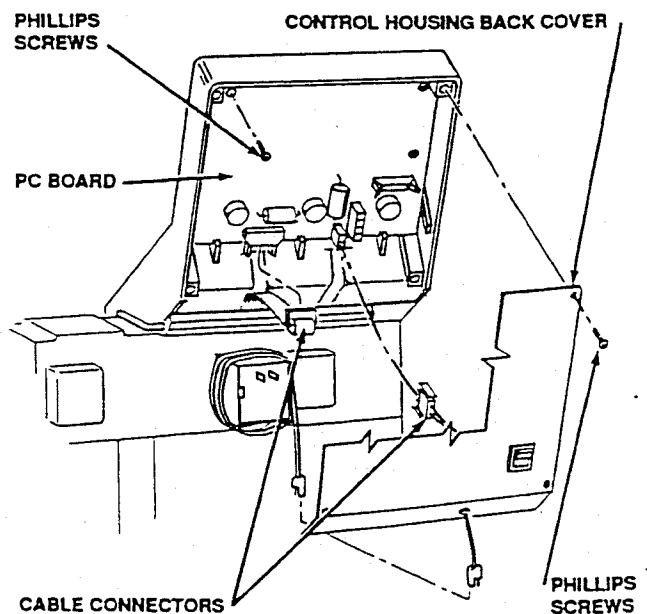


Figure 4. Removing the printed circuit board and display panel (rear view).

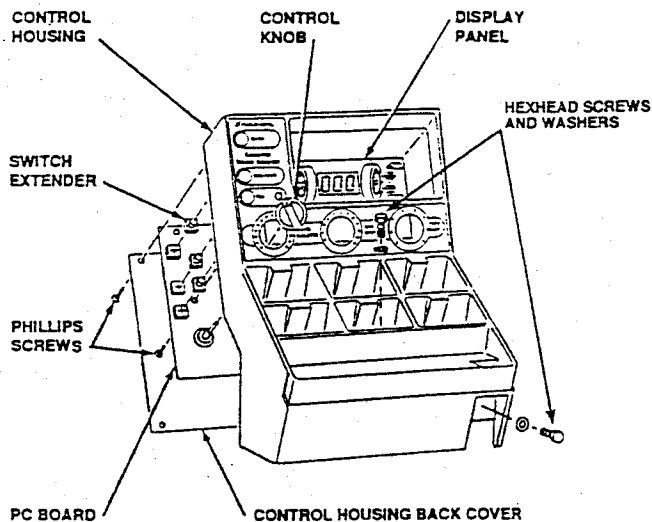


Figure 5. Removing the printed circuit board and display panel (front view).

4. Pull off the three control knobs from the front panel.

**CAUTION:** Do not loosen the two small nuts on the lower left of the PC board. They secure a transistor and heat sink to the board.

5. Remove the three Phillips screws from the back of the PC board and remove the PC board and display panel assembly from the housing.
6. Remove the switch extenders from the three pushbuttons on the PC board and install them on the new board.
7. Install the replacement PC board and display assembly, secure with three Phillips screws.
8. Reconnect the two cable connectors to the back of the PC board and reinstall the back cover.
9. Reassemble the upper housing and the lower base.

## Weight Tray and Control Housing Removal

Be sure to remove all weights and other material from the weight trays before removing them from the balancer. To Remove the weight tray and control housing, proceed as follows:

1. Remove the upper housing and the PC board and display panel assemblies as described previously. If you are removing the control housing for access to the measuring head and sensor assembly, leave the control knobs and the PC board and display attached to the weight tray.

2. Use a 1/2-inch socket to remove the two hexhead screws and washers, figure 5. One screw is located on the lower face of the weight tray, the other is located in a weight tray pocket.

## Measuring Head and Sensor Panel Removal

Remove and replace the measuring head and sensor panel assemblies, figure 6, as follows:

1. Remove the upper housing as described previously.
2. Remove the weight tray and control housing as previously described.

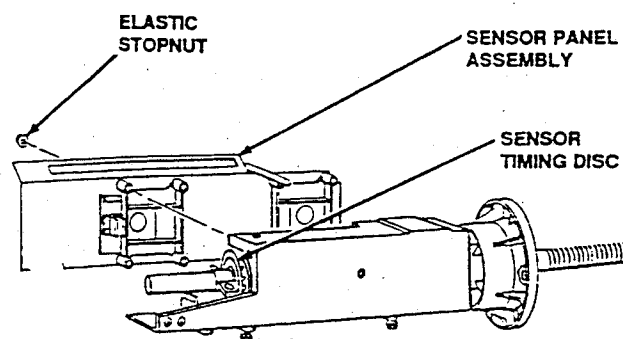


Figure 6. Removing the sensor panel assembly.

**CAUTION:** Do not scratch the sensor timing disc or get it dirty. Doing so can cause the balancer to malfunction.

3. Use a 3/8-inch wrench to remove the 9 elastic stopnuts (ESNA) from the studs that secure the sensor panel assembly to the measuring head. Then remove the sensor panel assembly.
4. If the measuring head is to be replaced, hold the spindle flange securely and use a 9/16-inch wrench to remove the stub shaft bolt and stub shaft from the spindle. Install the stub shaft on the new measuring head.
5. When reassembling the measuring head and sensor panel assembly, make sure that the sensor timing disc is centered in the sensor slot.

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***Snap-on***<sup>®</sup>

Form ZWB410

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